COMPUTING

MVME5100

Freescale MPC7410 or MPC750 VME SBC

Data Sheet

The MVME5100 is designed to meet the needs of OEMs servicing the defense and aerospace, industrial automation and medical market segments

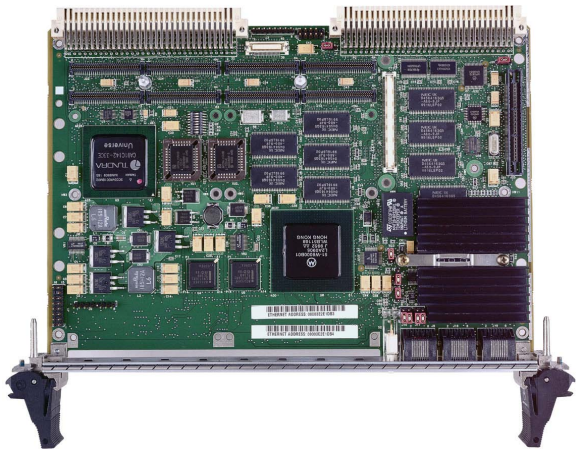
- MPC7410 or MPC750 microprocessor with 32 KB/32 KB L1 cache
- Up to 2MB of secondary backside cache
- 100 MHz frontside bus
- Up to 512MB of on-board ECC SDRAM expandable up to 1GB with optional RAM500 memory expansion modules
- 17MB flash memory
- Dual IEEE P1386.1 compatible 32/64-bit PMC expansion slots
- 64-bit PCI expansion mezzanine connector allowing up to four more PMCs
- Dual 16550 compatible async serial ports
- Dual 10BaseT/100BaseTX Ethernet
- 32 KB NVRAM and time-of-day clock with replaceable battery backup
- Four 32-bit timers and one watchdog timer
- On-board debug monitor
- Single VME slot even when fully configured with two PMC modules and both add-on memory mezzanines

RoHS 5/6 Pb SOLDER EXEMPT

The Artesyn Embedded Technologies MVME5100 series features the Freescale MPC7410 or MPC750 microprocessor with 32 KB/32 KB L1 cache. It uses the Artesyn PowerPlus II Architecture to support full PCI throughput of 264MB/s without starving the processor from its memory.

Based on an integrated PCI bridge-memory controller ASIC, PowerPlus II enables 582 MB/s memory read bandwidth and 640MB/s burst write bandwidth.

The MVME5100 is designed to meet the needs of OEMs servicing the defense and aerospace, industrial automation and transportation market segments.



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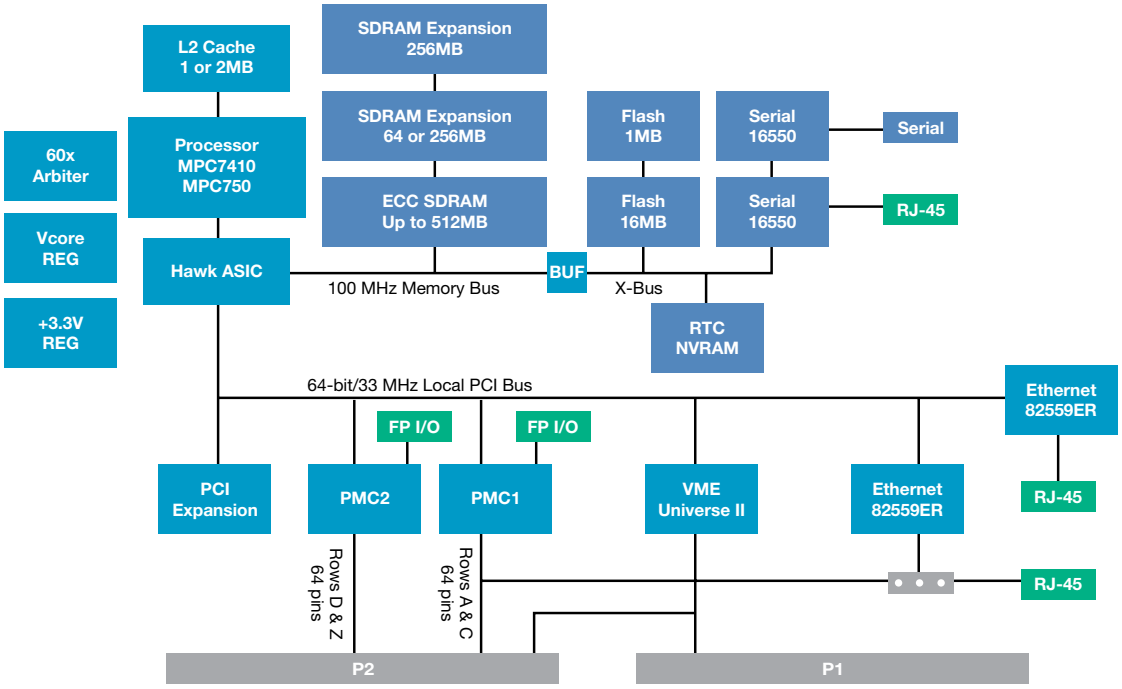
MVME5100 Block Diagram



Overview

I/O COMPATIBILITY

Historically, Artesyn has offered two tracks in its PowerPC® Architecture VME portfolio. The first track (which includes the MVME2600/2700) provides typical single-board computer I/O features including Ethernet, SCSI, multiple serial ports, a parallel port and a single PMC slot. The on-board I/O is routed to P2 and made available to the user via Artesyn MVME761 or MVME712M transition boards. The second track (which includes the MVME2300/2400) offers limited on-board I/O (Ethernet and a single serial port both via the front panel) but provides dual PMC slots enabling maximum user I/O customization.

The MVME5100 merges the best features of both tracks enabling the OEM to support varying I/O requirements with the same base platform, simplifying part number maintenance, technical expertise requirements and sparing.

P2 I/O MODES

The MVME5100 supports two, jumper-configurable P2 I/O modes; PMC and IPMC. PMC mode is backward compatible with the MVME2300/MVME2400. In PMC mode, 64 pins from PMC slot 1 and 46 pins from PMC slot 2 are available onP2 for PMC rear I/O.

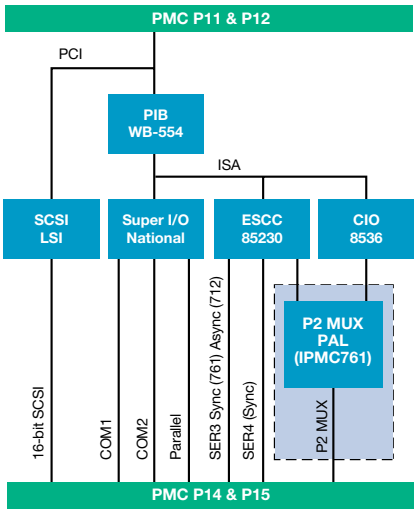
In IPMC mode, the MVME5100 supports legacy MVME761 or MVME712M I/O modules (with limited PMC I/O) when an IPMC761 or IPMC712 PMC card is populated in PMC slot 1. In this configuration, PMC slot 2 contains some signals that are reserved for extended SCSI.

IPMC MODULES

The IPMC761 and IPMC712 are optional add-on PMC modules that provide backward compatibility with previous-generation Artesyn products (such as MVME2600 and MVME2700) using the MVME761 or MVME712M transition board. IPMC modules provide rear I/O support for the following:

- One single-ended Ultra Wide SCSI port
- One parallel port
- Four serial ports (2 or 3 async and 1 or 2 sync/async, depending on module)

With this PMC card configuration, the memory mezzanine, one PMC slot and the PMCspan are still available, providing support for OEM product customization.



TRANSITION MODULES

The MVME761 transition module provides industry standard connector access to the IEEE 1284 parallel port, a 10BaseT or 100BaseT port via an RJ-45 connector, two DB-9 connectors providing access to the asynchronous serial ports configured as EIA-574 DTE and two HD-26 connectors providing access to the sync/async serial ports. These serial ports, labeled as Serial 3 and Serial 4 on the faceplate of the MVME761, are individually user-configurable as EIA-232, DCE or DTE via the installation of Artesyn Serial Interface Modules (SIMs). A P2 adapter board provides interface signals to the MVME761 transition module. Two separate P2 adapter boards are available: one for 3-row backplanes and one for 5-row backplanes. The 3-row P2 adapter board provides connection for 8-bit SCSI. A 5-row P2 adapter board supports 16-bit SCSI and PMC I/O.

The MVME712M transition module provides industry standard connector access to the Centronics parallel port, a narrow SCSI port, and four DB-25 connectors providing access to the asynchronous/synchronous serial ports jumper configurable as EIA-232 DCE or DTE. A P2 adapter board provides interface signals to the MVME712M transition module. The 3-row P2 adapter board also provides connection for 8-bit SCSI. To gain access to the additional user-definable I/O pins provided via the 5-row VME64 extension connector, a special P2 adapter board is available. This adapter panel replaces the traditional 3-row P2 adapter board and extends its capability by providing access to the PMCI/O pins.

Software Support

FIRMWARE MONITOR

Firmware must fulfill the traditional functions of test and initialization and provide operating system boot support. The MVME5100 firmware monitor exceeds these requirements with a proven monitor from the embedded VME leader. It expands features like powerup tests with extensive diagnostics, as well as a powerful evaluation and debug tool for simple checkout or when high-level development debuggers require additional support. All this is included with the MVME5100 firmware; plus it supports booting both operating systems and kernels.

OPERATING SYSTEMS AND KERNELS

MVME5100 supports booting a variety of operating systems, including VxWorks from Wind River Systems, Inc., Integrity from Green Hills, and Linux from a variety of partners.

Specifications

PROCESSOR

	MPC7410	MPC750
Clock Frequency:	400/500 MHz	450 MHz
On-chip Cache (I/D):	32 K/32 K	450 MHz
On-chip Cache (I/D):	32 K/32 K	32 K/32 K
Secondary Cache:	2MB	1MB

MAIN MEMORY

- Type: PC100 ECC SDRAM with 100 MHz bus
- Capacity: Up to 512MB on-board, expandable to 1.5GB with RAM500 memory mezzanines
- Single Cycle Accesses: 10 Read/5 Write
- Read Burst Mode: 7-1-1-1 idle; 2-1-1-1 aligned page hit
- Write Burst Mode: 4-1-1-1 idle; 2-1-1-1 aligned page hit
- Architecture: 64-bit, single interleave

FLASH MEMORY

- Type: EEPROM, on-board programmable
- Capacity: 1MB via two 32-pin PLCC/CLCC sockets; 16 MB surface mount
- Read Access (16MB port): 70 clocks (32-byte burst)
- Read Access (1MB port): 262 clocks (32-byte burst)

NVRAM

- Capacity: 32 KB (4 KB available for users)
- Cell Storage Life: 50 years at 55° C
- Cell Capacity Life: 5 years at 100% duty cycle, 25° C
- Removable Battery: Yes

VMEBUS ANSI/VITA 1-1994 VME64 (IEEE STD 1014)

- Controller: Tundra Universe
- DTB Master: A16–A32; D08–D64, BLT
- DTB Slave: A24–A32; D08–D64, BLT, UAT
- Arbiter: RR/PRI
- Interrupt Handler/Generator: IRQ 1–7/Any one of seven IRQs
- System Controller: Yes, jumperable or auto detect
- Location Monitor: Two, LMA32

COUNTERS/TIMERS

- TOD Clock Device: M48T37V
- Real-Time Timers/Counters: Four, 32-bit programmable
- Watchdog Timer: Time-out generates reset

ETHERNET INTERFACE

- Controller: Two Intel® 82559ER
- Interface Speed: 10/100 Mbps
- PCI Local bus DMA: Yes, with PCI burst
- Connector: One routed to front panel RJ-45, one routed to front panel RJ-45 or optionally routed to P2, RJ-45 on MVME761

ASYNCHRONOUS SERIAL PORTS

- Controller: 16C550C UART
- Number of Ports: Two, 16550 compatible
- Configuration: RS-232 DTE/DCE
- Async Baud Rate, bps max.: 38.4 K EIA-232, 115 Kbps raw
- Connector: One routed to front panel RJ-45, one on planar for development use

DUAL IEEE P1386.1 PCI MEZZANINE CARD SLOTS

- Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
- PCI Bus Clock: 33 MHz
- Signaling: 5 V
- Power: +3.3 V, +5 V, ±12 V; 7.5 watts maximum per PMC slot
- Module Types: Two single-wide or one doublewide, front panel or P2 I/O

PCI EXPANSION CONNECTOR

- Address/Data: A32/D32/D64
- PCI Bus Clock: 33MHz
- Signaling: 5 V
- Connector: 114-pin connector located on the planar of the MVME5100

POWER REQUIREMENTS

(not including power required by PMC or IMPC modules)

	+5 V ± 5%	+12 V ± 10%	–12 V ± 10%
MVME5100	3.0 A typ.	8.0 mA typ.	2.0 mA

BOARD SIZE

- Height: 233.4 mm (9.2 in.)
- Depth: 160.0 mm (6.3 in.)
- Front Panel Height: 261.8 mm (10.3 in.)
- Width: 19.8 mm (0.8 in.)
- Max. Component Height: 14.8 mm (0.58 in.)

IPMC Modules

PMC INTERFACE

- Address/Data: A32/D32/D64, PMC PN1, PN2, PN3, PN4 connectors
- PCI Bus Clock: 33 MHz
- Signaling: 5 V
- Module Type: Basic, single-wide; P2 I/O

SCSI BUS

- Controller: Symbios 53C895A
- PCI Local Bus DMA: Yes, with PCI local bus burst
- Asynchronous (8-bit mode): 5.0MB/s
- Ultra SCSI: 20.0MB/s (8-bit mode), 40.0MB/s (16-bit mode)
- Note: 16-bit SCSI operation precludes the use of some PMC slot 2 signals

SYNCHRONOUS SERIAL PORTS

- Controller: 85230/8536
- Number of Ports: Two (IPMC761); one (IPMC712)
- Configuration: IPMC761: TTL to P2 (both ports), SIM configurable on MVME761; IPMC712: EIA-232 to P2
- Baud Rate, bps max.: 2.5 M sync, 38.4 K async
- Oscillator Clock Rate (PCLK): 10 MHz/5 MHz

ASYNCHRONOUS SERIAL PORTS

- Controller: 16C550 UART; 85230/8536
- Number of Ports: Two (IPMC761); three (IPMC712)
- Configuration: EIA-574 DTE (IPMC761); EIA-232 (IPMC712)
- Async Baud Rate, bps max.: 38.4 K EIA-232, 115 Kbps raw

PARALLEL PORT

- Controller: PC97307
- Configuration: 8-bit bi-directional, full IEEE 1284 support; Centronics compatible (minus EPP and ECP on MVME712M)
- Modes: Master only

POWER REQUIREMENTS

(Additional power load placed on MVME5100 series with IPMC installed)

	+5 V ±5%	+12 V ±10%	–12 V ±10%
MVME5100:	3.8 A max. 3.0 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110- 21xx:	3.8 A max. 3.1 A typ.	8.0 mA typ.	2.0 mA typ.
MVME5110- 22xx:	4.7 A max. 3.5 A typ.	8.0 mA typ.	2.0 mA typ.

Transition Modules

I/O Connectors

	MVME761	MVME712M
Asynchronous Serial Ports:	Two, DB-9 labeled as COM1 and COM2	Three, DB-25 labeled Serial 1, Serial 2 and Serial 3
Synchronous Serial Ports:	Two, HD-26 labeled as Serial 3 and Serial 4 (user-configurable via installation of SIMs); two 60-pin connectors on MVME761 planar for installation of two SIMs	One, DB-25 labeled as Serial 4
Parallel Port:	HD-36, Centronics compatible	D-36, Centronics compatible
Ethernet:	10BaseT or 100BaseTX, RJ-45	Not available
SCSI:	8- or 16-bit, 50- or 68-pin connector via P2 adapter	8-bit, standard SCSI D-50

All Modules

ENVIRONMENTAL

(Minimum of 400 LFM of forced air cooling is recommended for operation in the higher temperature ranges.)

	Operating	Non-operating
Temperature:	0 °C to +55 °C (inlet air temp. with forced air cooling*)	–40 °C to +85 °C
Humidity (NC):	5% to 90%	5% to 90%
Vibration:	2 Gs RMS, 20 – 2000 Hz random	6 Gs RMS, 20 – 2000 Hz random

ELECTROMAGNETIC COMPATBILITY (EMC)

- Intended for use in systems meeting the following regulations:
  - U.S.: FCC Part 15, Subpart B, Class A (non-residential)
  - Canada: ICES-003, Class A (non-residential)
- This product was tested in a representative system to the following standards:
  - CE Mark per European EMC Directive 89/336/EEC with Amendments; Emissions: EN55022 Class B; Immunity: EN55024

SAFETY

All printed wiring boards (PWBs) are manufactured with a flammability rating of 94V-0 by UL recognized manufacturers.

DEMONSTRATED MTBF

(based on a sample of eight boards in accelerated stress environment)

- Mean: 190,509 hours
- 95% Confidence: 107,681 hours

Ordering Information

All models are available with either VME Scanbe front panel (-xxx1) or IEEE 1101 compatible front panel (-xxx3).

Part Number	*Description*	*Weight*
MVME51005E-0161	450 MHz MPC750, 512MB ECC SDRAM, 17MB flash and 1MB L2 cache Scanbe 5E	0.37 kg
MVME51005E-0163	450 MHz MPC750, 512MB ECC SDRAM, 17MB flash and 1MB L2 cache IEEE 5E	0.42 kg
400/500 MHz MPC7410 Commercial Models		
MVME51105E-2161	400 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache Scanbe 5E	0.42 kg
MVME51105E-2163	400 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache IEEE 5E	0.42 kg
MVME51105E-2261	500 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache Scanbe 5E	0.38 kg
MVME51105E-2263	500 MHz MPC7410, 512MB ECC SDRAM, 17MB flash and 2MB L2 cache IEEE 5E	0.42 kg
MVME712M Compatible I/O		
IPMC7126E-002	Multifunction rear I/O PMC module; 8-bit SCSI, Ultra Wide SCSI, one parallel port, three async and one sync/async serial ports	
MVME712M6E	Transition module connectors: One DB-25 sync/async serial port, three DB-25 async serial port, one AUI connector, one D-36 parallel port, and one 50-pin 8-bit SCSI; includes 3-row DIN P2 adapter module and cable	
MVME761 Compatible I/O		
IPMC7616E-002	Multifunction rear I/O PMC module; 8-bit SCSI, one parallel port, two async and two sync/async serial ports	
MVME7616E-001	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, one RJ-45 10/100 Ethernet connector; includes 3-row DIN P2 adapter module and cable (for 8-bit SCSI)	
MVME7616E-011	Transition module: Two DB-9 async serial port connectors, two HD-26 sync/async serial port connectors, one HD-36 parallel port connector, and one RJ-45 10/100 Ethernet connector; includes 5-row DIN P2 adapter module and cable (for 16-bit SCSI); requires backplane with 5-row DIN connectors	
SIM232DCE6E	EIA-232 DCE Serial Interface Module 6E	
SIM232DTE6E	EIA-232 DTE Serial Interface Module 6E	
Related Products		
PMCSPAN16E-002	Primary PMC expansion for MVME5100/5110/5500 w/Scanbe handles, 6E	
PMCSPAN26E-002	Primary PMC expansion for MVME5100/5110/5500 w/IEEE handles, 6E	
PMCSPAN16E-010	Secondary PMC expansion for PMCSPAN26E-002 w/Scanbe handles, 6E	
PMCSPAN26E-010	Secondary PMC expansion for PMCSPAN26E-002 w/IEEE handles, 6E	
RAM5006E-005	Stackable (top) 128MB ECC SDRAM mezzanine 6E	
RAM5006E-015	Stackable (bottom) 128MB ECC SDRAM mezzanine 6E	
RAM5006E-006	Stackable (top) 256MB ECC SDRAM mezzanine 6	
RAM5006E-016	Stackable (bottom) 256MB ECC SDRAM mezzanine 6E	
RAM5006E-010	Stackable (top) 512MB ECC SDRAM mezzanine 6E	
RAM5006E-020	Stackable (bottom) 512MB ECC SDRAM mezzanine 6E	
Documentation		
V5100A/IH	MVME5100 Installation and Use	
V5100A/PG	Programmer's Reference Guide	
VME761A/IH	MVME761 Transition Module Installation and Use	
VME712MA/IH	MVME712 Transition Module Installation and Use	
PPCBUGA1/UM **PPCBUGA2/UM**	PPCBug Firmware Package User's Manual (volumes one and two)	
PPCDIAA/UM	PPCBug Diagnostics Manual	

SOLUTION SERVICES

Artesyn Embedded Technologies provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh.

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